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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,067	02/28/2002	Benjamin P. Hoag	83659AEK	1424

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EXAMINER	
GARRETT, DAWN L	
ART UNIT	PAPER NUMBER
1774	3

DATE MAILED: 07/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/086,067	HOAG ET AL.	
	Examiner	Art Unit	
	Dawn Garrett	1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claims 12 and 13 are objected to because of the following informalities:

Claims 12 and 13 recite "The device of claim 1 wherein the substituents are selected...". Claim 1 recites two compounds comprising a host and a dopant. For purposes of examination, the examiner has interpreted "the substituents" as all substituents present on all the compounds. If applicant intends "the substituents" to only correspond with one of the compounds in the light-emitting layer, clarification and correction are suggested.

2. Claim 18 is objected to because of the following informalities: The "and" between "halide" and "alkyl" is unnecessary and it is suggested the "and" be replaced with a comma.

3. Claim 19 is objected to because of the following informalities: The "and" between "fluorine" and "alkyl" is unnecessary and it is suggested the "and" be replaced with a comma.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-11, 13-23, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al. (US 5,972,247) in view of "New Laser Dyes", Applied Physics (Berlin), volume 3, no. 1, pages 81-88, (1974). Instant claim 1 requires an organic electroluminescent device comprising a light-emitting layer containing a host and a dopant where the dopant comprises a boron compounds containing a bis(azinyl)methane boron complex group. Shi '721 teaches an organic electroluminescent device comprising an anode, a cathode and an organic electroluminescent element between the electrodes (see abstract). Shi teaches light-emitting layers commonly comprise host material doped with a guest material. The host material is commonly electron transport material such as 8-hydroxyquinoline aluminum complex [these materials are chelates of oxine and an example of such a compound is Aluminum trisoxine, a.k.a. tris(8-quinolinol)aluminum (see col. 50, lines 2-3 and 39)] and the dopant is usually chosen from highly fluorescent dyes (see col. 1, lines 29-40) per instant claims 1, 8, 9, and 11. In addition, Shi '721 teaches a light-emitting layer (EML) comprising a host material such as 9, 10-di-(2-naphthyl) anthracene (see col. 6, lines 53-62) derivatives doped with fluorescent dye (see col. 47, lines 59-62) per instant claims 1, 8, and 10. Shi '721 fails to teach specific fluorescent dyes comprising a bis(azinyl)methane boron complex group as required by independent instant claim 1. Applied Physics teaches, in analogous art, a fluorescent dye with strong intensity, which is identical to instant claim 23 compound "Inv-10" (see page 88, compound V 12) per instant claims 4-7, 14-20, and 23. It would have been obvious to one of ordinary skill in the art at the time of the invention to have formed a light emitting layer comprising either

Alq3 or anthracene derivative host material and have selected a dopant according to "Inv-10", because Shi et al. teaches a light emitting layer comprising an Alq3 or anthracene derivative host material doped with a fluorescent dye and Applied Physics teaches "Inv-10" boron fluorescent dye is a known fluorescent dye with strong intensity. Per instant claims 2, 3, 21, and 22, Shi '721 teaches doping a light emitting layer with 1.0% fluorescent dye (see col. 56, lines 22-27). Shi '721 teaches a light-emitting device with a doped light emitting layer provides highly efficient electroluminescence (see col. 1, lines 43-44). Accordingly, per instant claim 13, it would have been obvious to one of ordinary skill in the art at the time of the invention to have expected a greater luminescence with a doped layer than an undoped layer absent evidence otherwise, because Shi '721 teaches the high efficiency of luminescence of a doped layer. Shi '721 further teaches EL elements may be used for the production of a full color EL display panel (see col. 2, lines 66-67) per instant claim 25. The examples of Shi '721 show the EL devices are subjected to electric current to emit light per instant claim 26 (see col. 52, line 52 through col. 58, line 46).

6. Claims 1-11, 13-15, and 19-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al. (US 5,972,247) in view of "Fluorescent Tricyclic beta-Azavinamidine-BF_2 Complexes", Sathyamoorthi et al., Heteroatom Chemistry, Vol. 4, No. 6, pages 603-608, 1993. Instant claim 1 requires an organic electroluminescent device comprising a light-emitting layer containing a host and a dopant where the dopant comprises a boron compounds containing a bis(azinyl)methane boron complex group. Shi '721 teaches an organic electroluminescent device comprising an anode, a

cathode and an organic electroluminescent element between the electrodes (see abstract). Shi teaches light-emitting layers commonly comprise host material doped with a guest material. The host material is commonly electron transport material such as 8-hydroxyquinoline aluminum complex [these materials are chelates of oxine and an example of such a compound is Aluminum trisoxine, a.k.a. tris(8-quinolinol)aluminum or "Alq3" (see col. 50, lines 2-3 and 39)] and the dopant is usually chosen from highly fluorescent dyes (see col. 1, lines 29-40) per instant claims 1, 8, 9, and 11. In addition Shi '721 teaches a light-emitting layer (EML) comprising a host material such as 9, 10-di-(2-naphthyl) anthracene (see col. 6, lines 53-62) derivatives doped with fluorescent dye (see col. 47, lines 59-62) per instant claims 1, 8, and 10. Shi '721 fails to teach specific fluorescent dyes comprising a bis(azinyl)methane boron complex group as required by independent instant claim 1. Heteroatom Chemistry teaches, in analogous art, a fluorescent dye "compound 3" (see page 604, top right) with a maximum peak wavelength of 468 nm, which is identical to instant claims 23 and 24 compound "Inv-5" per instant claims 4-7, 14-20, and 24. It would have been obvious to one of ordinary skill in the art at the time of the invention to have formed a light emitting layer comprising either Alq3 or anthracene derivative host material and have selected a dopant according to "Inv-5", because Shi et al. teaches a light emitting layer comprising an Alq3 or anthracene derivative host material doped with a fluorescent dye and Heteroatom Chemistry teaches "Inv-5" boron fluorescent dye is a known, intense fluorescent dye for fluorescent applications (see page 603, topmost paragraph right column). Per instant claims 2, 3, 21, and 22, Shi '721 teaches doping a light emitting

layer with 1.0% fluorescent dye (see col. 56, lines 22-27). Shi '721 teaches a light-emitting device with a doped light emitting layer provides highly efficient electroluminescence (see col. 1, lines 43-44). Accordingly, per instant claim 13, it would have been obvious to one of ordinary skill in the art at the time of the invention to have expected a greater luminescence with a doped layer than an undoped layer absent evidence otherwise, because Shi '721 teaches the high efficiency of luminescence of a doped layer. Shi '721 further teaches EL elements may be used for the production of a full color EL display panel (see col. 2, lines 66-67) per instant claim 25. The examples of Shi '721 show the EL devices are subjected to electric current to emit light per instant claim 26 (see col. 52, line 52 through col. 58, line 46).

7. Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al. (US 5,972,247) in view of "Fluorescent Tricyclic beta-Azavinamidine-BF_2 Complexes", Sathyamoorthi et al., Heteroatom Chemistry, Vol. 4, No. 6, pages 603-608, 1993 in further view of Shirasaki (US 5,834,894). Shi '721 and the Heteroatom Chemistry article are relied upon as set forth above for the rejection of claim 12. Shi '721 renders obvious a light emitting layer comprising Alq3 as a host material and teaches the light emitting layer is doped with a fluorescent dye. Heteroatom Chemistry teaches instant Inv-5 (compound 3 in the reference) as a fluorescent dopant with a maximum wavelength at 468 nm (which is in the blue-green region of the visible spectrum as shown in figure 3 of attached reference Patterns in Nature: Light and Optics, "Color and Light", seven pages, last modified 26 December 1999, Department of Physics and Astronomy, Arizona State University, URL:

http://acept.asu.edu/PiN/rdg/color/color.shtml). Shi and Heteroatom Chemistry fail to teach specifically the color emitted from the light emitting layer. Shirasaki teaches in analogous art, in an EL device comprising Alq3 in the emitting layer, Alq3 itself emits green color even if a blue dopant is doped into the Alq3 layer (see col. 6, lines 45-48). Accordingly, it would have been obvious to one of ordinary skill in the art to have expected green light emission from the light emitting device comprising Alq3 and a boron fluorescent dopant according to "Inv-5", because Shirasaki teaches a light emitting layer comprising Alq3 emits green light.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (703)305-0788. The examiner can normally be reached 9:00 a.m. to 5:30 p.m. Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached at (703)-308-0449. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-2351.

Dawn L Garrett
DAWN GARRETT
PATENT EXAMINER
TECHNOLOGY CENTER 1700

D.G.
June 23, 2003